

CLAIMS

What is claimed is:

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- 1 1. An integrated circuit, comprising:
2 a set of voltage generators to generate a set of direct current (DC)
3 voltages;
4 a set of sense amplifiers coupled to compare a reference voltage with
5 the set of DC voltages; and
6 logic coupled to each sense amplifier in the set of sense amplifiers to
7 interpret the comparison of the reference voltage and the set of DC voltages.
- 1 2. The integrated circuit of claim 1 wherein the set of voltage generators is
2 responsive to a set of configuration bits to determine the set of DC voltages.
- 1 3. The integrated circuit of claim 2, further comprising a set of switches coupled
2 between the set of voltage generators and the set of sense amplifiers to enable the set
3 of DC voltages to be applied to the non-inverting input of each sense amplifier in the
4 set of sense amplifiers.
- 1 4. The integrated circuit of claim 2, wherein each voltage generator in the set of
2 voltage generators is a digital-to-analog converter.
- 1 5. The integrated circuit of claim 1, further comprising second logic coupled to
2 open and close the set of switches to connect the set of DC voltages to the non-
3 inverting inputs of the set of sense amplifiers.
- 1 6. The integrated circuit of claim 5, wherein the second logic comprises a
2 boundary-scan register.

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1 7. The integrated circuit of claim 5, wherein the second logic comprises an
2 input/output loop back pattern generator.

1 8. A system, comprising:

2 an integrated circuit having a set of voltage generators to generate a set
3 of direct current (DC) voltages, a set of sense amplifiers coupled to compare a
4 reference voltage with the set of DC voltages, and logic coupled to each sense
5 amplifier in the set of sense amplifiers to interpret the comparison of the reference
6 voltage and the set of DC voltages; and

7 a structural tester coupled to the integrated circuit to apply a reference
8 voltage to the inverting input of each sense amplifier in the set of sense amplifiers.

1 9. The system of claim 8, wherein the set of voltage generators is responsive to a
2 set of configuration bits to determine the set of DC voltages.

1 10. The system of claim 8, wherein the integrated circuit further comprises a set of
2 switches coupled between the set of voltage generators and the set of sense amplifiers
3 to enable the set of DC voltages to be applied to the non-inverting input of each sense
4 amplifier in the set of sense amplifiers.

1 11. The system of claim 8, wherein each voltage generator in the set of voltage
2 generators is a digital-to-analog converter.

1 12. The system of claim 8, wherein the logic to interpret the comparison of the
2 reference voltage and the set of analog voltages comprises a boundary scan register.

1 13. The system of claim 8, wherein the logic to interpret the comparison of the
2 reference voltage and the set of analog voltages comprises input/output loop back
3 compare circuitry.

1 14. The system of claim 8, wherein the integrated circuit further comprises a set of
2 switches coupled between the set of voltage generators and the set of sense amplifiers
3 to enable the set of DC voltages to be applied to the non-inverting input of each sense
4 amplifier in the set of sense amplifiers, and wherein the integrated circuit further
5 comprises second logic coupled to open and close the set of switches.

1 15. The system of claim 14, wherein the second logic comprises a boundary-scan
2 register.

1 16. The system of claim 14, wherein the second logic comprises an input/output
2 loop back pattern generator.

1 17. A method of manufacturing an integrated circuit, comprising:
2 coupling a set of levels generating circuits to a set of sense amplifiers,
3 wherein the set of sense amplifiers are to compare a reference voltage to a set of direct
4 current (DC) voltage levels generated by the set of levels generating circuits; and
5 coupling the set of sense amplifiers to logic to interpret the comparison
6 of the reference voltage and the set of voltage levels.

1 18. The method of claim 17, further comprising coupling the set of levels
2 generating circuits to be responsive to a set of configuration bits to set the values of
3 the set of DC voltage levels.

1 19. The method of claim 18, further comprising coupling a set of switches between
2 the set of levels generating circuits and the set of sense amplifiers to enable the set of
3 DC voltage levels to be applied to the non-inverting input of each sense amplifier.

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1 20. The method of claim 19, wherein coupling a set of levels generating circuits to
2 a set of sense amplifiers comprises coupling a set of digital-to-analog converters to
3 the set of sense amplifiers.

1 21. The method of claim 17, wherein coupling the set of sense amplifiers to logic
2 to interpret the comparison of the reference voltage and the set of DC voltage levels
3 comprises coupling the set of sense amplifiers to a boundary scan register to interpret
4 the comparison of the reference voltage and the set of DC voltage levels.

1 22. The method of claim 17, wherein coupling the set of sense amplifiers to logic
2 to interpret the comparison of the reference voltage and the set of DC voltage levels
3 comprises coupling the set of sense amplifiers to input/output loop back compare
4 circuitry to interpret the comparison of the reference voltage and the set of DC voltage
5 levels.

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1 23. The method of claim 19, further comprising coupling second logic to open and
2 close the set of switches.

1 24. The method of claim 23, wherein coupling second logic to open and close the
2 set of switches comprises applying values from a boundary-scan register to open and
3 close the set of switches.

1 25. The method of claim 23, wherein coupling second logic to open and close the
2 set of switches comprises applying values from an input/output loop back pattern
3 generator to open and close the set of switches, wherein the second logic comprises an
4 input/output loop back pattern generator.

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1 26. An apparatus, comprising:

2 an integrated circuit device having:
3 a first number of input pins; and
4 levels generating circuitry coupled to at least some of the first
5 number of input pins, the levels generating circuitry being responsive to a set
6 of configuration bits to enable concurrent input levels testing or parallel input
7 levels testing of the first number of input pins using a second smaller number
8 of input pins.

1 27. The apparatus of claim 26, wherein the levels generating circuitry comprises:

2 a set of voltage generators to generate a set of direct current (DC)
3 voltages;
4 a set of sense amplifiers coupled to compare a reference voltage with
5 the set of DC voltages; and
6 logic coupled to each sense amplifier in the set of sense amplifiers to
7 interpret the comparison of the reference voltage and the set of DC voltages.

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1 28. The apparatus of claim 27, further comprising a set of switches coupled
2 between the set of voltage generators and the set of sense amplifiers to enable the set
3 of DC voltages to be applied to the non-inverting input of each sense amplifier in the
4 set of sense amplifiers.

1 29. The integrated circuit of claim 27, wherein each voltage generator in the set of
2 voltage generators is a digital-to-analog converter.

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1 30. A method, comprising:
2 testing at least one integrated circuit device having a first number of
3 input pins and levels generating circuitry coupled to at least some of the first number
4 of input pins by:
5 receiving a set of configuration bits at the levels generating
6 circuitry; and
7 receiving test input levels at a second smaller number of input
8 pins to enable parallel input levels testing of the first number of input pins.

1 31. The method of claim 30, further comprising:
2 generating direct current (DC) voltages;
3 comparing a reference voltage with the set of DC voltages; and
4 interpreting the comparison of the reference voltage and the set of DC
5 voltages.

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1 32. The method of claim 31, wherein receiving a set of configuration bits at a
2 levels generating circuitry comprises receiving a set of configuration bits at digital-to-
3 analog converters

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